

Amendments to the Specification

After the title and before the section Field of the Invention, please insert the following new section:

Cross-Reference to Related Application

This application is a continuation-in-part of U.S. Patent Application Serial No. 10/321,762 filed December 17, 2002, now allowed.

On page 18, after paragraph [0055] line 17 and before paragraph [0056] line 18, please add the following paragraphs:

In another non-limiting embodiment of the invention, the thermoplastic material (such as polyethylene) into which the polymerizing mixture is injected, and which material forms the temporary container, is replaced by a polar solvent-soluble thermosealing material, such as polyvinyl alcohol. The thermosealing materials would serve essentially the same purpose as the thermoplastic material. The thermosealing materials would be similar to the thermoplastic materials and have the same or similar barrier properties with respect to heat transfer fluids in that they would be impenetrable. Each thermosealing material would also be similar in its ability to be cut and thermally sealed to itself to form the temporary container. In one non-limiting embodiment of the invention, the thermosealing materials may be sealed at a temperature between about 120 and about 150°C.

However, the thermosealing materials would have different solubility properties from the thermoplastic materials such as polyethylene in that they would be soluble in polar solvents. This difference in property would significantly alter the method by which the bag or temporary container is separated from the final DRA polymer product. Instead of mechanically removing the container, the DRA polymer and encapsulating temporary container may be placed in a polar solvent, with or without agitation, thus dissolving the bag entirely. Alternatively,

the polar solvent may be sprayed or otherwise applied to the thermosealing material container to remove it. Upon dissolving the thermosealing material from the surface of the DRA polymer, the DRA polymer is collected to be further granulated and ground as described in this invention. The solution of the thermosealing material in the solvent may be collected as a waste stream, or as a potential dispersing aid in a final formulation containing the DRA polymer and dispersing fluid as will be further explained.

Acceptable polar solvent-soluble thermosealing materials include, but are not necessarily limited to polyvinyl alcohol (PVA) and various grades of polyvinyl acetate having differing amounts of OH functionality via hydrolysis. By the phrase "polyvinyl acetate having at least some hydroxyl functionality" is meant polyvinyl acetate that has been hydrolyzed so that the polymer chains have an average of one hydroxyl group per chain. Suitable polar solvents include, but are not necessarily limited to water, ethylene glycol, propylene glycol, diethylene glycol, dipropylene glycol, isopropyl alcohol, butyl alcohol, dipropylene glycol methyl ether, and mixtures thereof.

Yet another alternative, non-limiting embodiment of the invention involves the utilization of the thermosealing material dissolved in the polar solvent as a process fluid. That is, the process fluid would be composed of solubilized PVA and one or more of the above-mentioned processing solvents. The DRA polymer (at least already partially ground) would be combined with the process fluid and ground further to produce a DRA dispersion. Thus, in one non-limiting embodiment it may be advantageous to dissolve the PVA bag material in glycolic solvents or glycolic/water mixtures and utilize these same solutions of PVA for final processing of granulated DRA in a last stage grinder. In essence, granulated DRA polymer may be added to recaptured PVA processing fluid and this mixture subsequently utilized for final product dispersion or formulation purposes.

In another non-limiting embodiment of the invention, the PVA dispersion in polar solvent may be used as a process fluid in any size reduction operation, including but not necessarily limited to, the granulation or initial grinding of the DRA polymer. In the case of using the dispersion as a process fluid for initial

granulation, the same process fluid could be used in subsequent grinding to reach the 250-500 micron particle size. It will be appreciated that generally the term "grinding" is used herein to mean any size reduction using physical (as contrasted with chemical) operations. Often grinding is done in multiple steps to reduce items to ever smaller sizes. Occasionally, the term "granulation" is used to refer to an initial size reduction. It should be appreciated that the invention is not limited to any particular size of temporary containers.

Polyvinyl alcohol polymers (more precisely, polyvinyl acetate polymer hydrolyzed to hydroxyl functionality) are more typically utilized as stabilizing aids in suspension polymerization technology and in aqueous dispersion technology. Although PVA is unable to form micellar structures in aqueous medium due to its polymeric structure, suspension behavior is well documented for PVA. Polyvinyl alcohol cannot be polymerized directly from vinyl alcohol due to an abundance of free-radical transfer. Thus, polyvinyl acetate is prepared and hydrolyzed via a hydrolytic reaction to various degrees of hydroxyl functionality. This degree of hydrolysis also gives the polymer chemist the ability to adjust the degree of solubility to aqueous or aqueous/glycolic solvents. Hence, the degree of water solubility desired can be adjusted per the process.

Please make the following change in the specification on page 22:

[0065] Prior to the installation of the form, fill, seal device, experiment 1644-137 was run to demonstrate the feasibility/applicability of continuously charging the reactor system with monomer and catalyst. Thus, the material of this Example was transferred over to a refrigeration box into lay-flat tubing in order to allow for a complete polymerization or conversion to high polymer solids. Lay-flat tubing in this case is described as a continuous length of low density polyethylene tubing (4 mils thick) situated in the refrigeration box, connected to the Buss reactor via charge line, and blown down with nitrogen to provide an inert atmosphere. Thus, the Buss reactor was run for several hours at an alpha-olefin monomer charge rate of 90 lbs./hour (41 kg/hr), with the polymer outflow being transferred into the lay-flat tubing upon each reactor filling cycle. This particular reaction was run at

what was thought to be a relatively high catalyst level and surprisingly high drag reduction values were obtained after 24 hours of reaction time. Upon capturing the polymer after the 24-hour reaction cycle, the material was stored under nitrogen in the refrigeration trailer at 35-37 F (1.7-2.8°C). The final % drag or % solids at final conversion was not determined. In one non-limiting embodiment of the invention, one goal is to achieve % drag reduction in the range of 60-55% at 0.25 ppm active polymer in the hydrocarbon stream being treated. Results are shown in Table I III.

Please make the following changes on page 23:

TABLE I III
Solids and Drag Reduction Achieved for Reaction Example 2

[0067] Further details about grinding and size reduction of the polymer produced in the method of this invention to give a particulate polymer DRA prior to introduction into a hydrocarbon fluid may be found in U.S. patent application Serial No. 10/322,050, filed herewith, incorporated by reference herein.